

SAMPLE COST ANALYSIS DATA REQUIREMENT (CADRE)

TIME PHASED-LIFE CYCLE COST

ALTERNATIVE _____

Date: _____

Prepared by: _____ Phone # _____ E-Mail: _____

Program/Project Name: _____

Estimated Period of Performance: _____

Program/Project Manager: _____ Phone# _____ E-mail _____

1.0 -- Project Overview

1.1 -- Project Characterization.

This section discusses the basic attributes of the project -- its configuration, the missions it will perform and threats it will counter, its relationship to other projects, and the major factors that will influence its cost. The presentation should be structured as follows:

1.1.1 Project Description. This paragraph provides a general description of the project, including the functions it will perform and key performance parameters. The parameters should be those most often used by cost estimators to predict project cost. Examples of key project characteristics and performance parameters are provided in Enclosure 1. A diagram or picture of the end item, with the major parts and subprojects appropriately labeled, should be included, if applicable.

1.1.2 Project Functional Relationships. This paragraph describes the "top-level" functional and physical relationships among the projects within the program as well as the project's relationship to other projects or programs, as applicable.

1.1.3 Project Work Breakdown Structure: This section identifies the WBS for the project (e.g., program management, hardware, software, testing). If this project is part of a program, the top level WBS for the program should be included, indicating the project's relationship to the program.

1.1.4 Government-Furnished Equipment and Property. This paragraph identifies the property that will be furnished by the Government and included in the life-cycle cost

estimates for the project. Any Government-furnished commercial off-the-shelf (COTS) software should be addressed in the discussion. Where Government-furnished equipment or property is common to other program/projects, the text should identify how the costs will be accounted for (e.g., shared, costed to one or more projects).

1.2 -- Project Characteristics.

This section provides a technical description of the hardware, software, and human characteristics of the project. It is divided into the following sub-elements:

1.2.1 Technical and Physical Description. This set of paragraphs describes the physical design parameters of the project. A separate discussion is provided for each equipment (hardware and software) work breakdown structure (WBS) item. Physical design parameters should include performance, operational (including project design life), and material (weight and material composition) characteristics. The planned sequence of changes in weight, performance, or operational characteristics that are expected to occur or have historically occurred as the program progresses through the acquisition and operating phases -- demonstration and validation (DEM/VAL), engineering and manufacturing development (EMD), production, and operation and support (O&S) -- should be noted here.

1.2.1.x (...x..) Subproject Description. This series of paragraphs (repeated for each subproject) describes the major equipment (hardware/software) WBS components of the project. The discussion should identify which items are off-the-shelf. The technical and risk issues associated with development and production of individual subprojects also must be addressed.

1.2.1.x.1 Functional and Performance Description. This subparagraph identifies the function(s) the (...x..) subproject is to perform. In addition, it describes the associated performance characteristics and lists any firmware to be developed for data processing equipment.

1.2.1.x.2 Environmental Conditions. This subparagraph identifies the environmental conditions expected to be encountered during development, production, transportation, storage, and operation of the subproject. It also identifies any hazardous, toxic, or radiological materials that may be encountered or generated during the subproject's development, manufacture, transportation, storage, operation, and disposal. The quantities of each hazardous material used or generated over the subproject's lifetime should be estimated based on the most current operations and maintenance concepts. The discussion should also describe the evaluation methodology for environmentally acceptable alternatives as well as the rationale for selection of alternatives. Finally, the alternatives considered, and reasons for rejection, must be identified.

1.2.1.x.3 Material, Processes, and Parts. This subparagraph describes the materials and processes entailed in the development and fabrication of the subproject. The discussion should identify the respective amount of each material to be used (e.g., aluminum, steel,

etc.). In addition, any standard or commercial parts, or parts for which qualified products lists have been established, should be identified.

1.2.1.x.4 Workmanship. This subparagraph describes any specific workmanship-related manufacturing or production techniques pertaining to the subproject.

1.2.1.x.5 Commonality. Equipment that is analogous or interchangeable among sub-projects should be identified here. Commonality with subprojects of other projects, or with variants of the basic project, should be identified. Breakouts, by weight, of common and project-specific components should be provided, if applicable.

1.2.2 Software Description. This paragraph describes the software resources associated with the project. It should distinguish among operational, application, and support software and identify which items must be developed and which can be acquired off-the-shelf. The paragraph applies to all projects that use computer and software resources. Information should be attached to the CADRE submission providing information on the factors that will influence software development and maintenance costs. Information can be provided in any format, such as a matrix or table. Additionally, this information should be tailored to satisfy specific software model requirements.

1.2.2.x (.x..) Software Sub-elements. This set of paragraphs (repeated for each software sub-element) describes the design and intended uses of project software.

1.2.2.x.1 Host Computer Hardware Description. This subparagraph describes the host computer project on which the software sub-element will be operating. This host project should be readily identifiable in the WBS given in paragraph 1.1.3., above.

1.2.2.x.2 Programming Description. This subparagraph identifies programming requirements that will influence the development and cost of the software sub-element. The discussion should address the programming language and programming support environment (including standard tools and modern programming practices) and the compiler(s) and/or assembler(s) to be used.

1.2.2.x.3 Design and Coding Constraints. This subparagraph describes the design and coding constraints under which the software will be developed (i.e., protocols, standards, etc.).

1.2.2.x.4 Commonality. This subparagraph identifies software that is analogous or interchangeable among sub-elements.

1.2.3 Human Performance Engineering. This paragraph identifies any special or unique human performance and engineering characteristics (i.e., constraints on allocation of functions to personnel and communication, and personnel and equipment interactions).

1.2.4 Project Safety. This identifies any special or unique project safety considerations (e.g., "fail safe" design, automatic safety, explosive safety needs, etc.).

1.2.5 Project Survivability. This paragraph discusses the survivability capabilities and features of the project. It describes the environments in which the project will be expected to operate, and identifies any unique materials incorporated in the project's design that contribute to its survivability.

1.3 -- Project Quality Factors.

This section identifies key project quality characteristics.

1.3.1 Reliability. This paragraph defines project reliability goals in quantitative terms, and defines the conditions under which the goals are to be met.

1.3.2 Maintainability. This paragraph focuses on maintainability characteristics. It describes the planned maintenance and support concept in the following quantitative terms:

- a. Project maintenance man-hours per operating hour, maintenance man-hours per operating hour by major component part of the project, operational ready rate, and frequency of preventative maintenance;
- b. Maintenance man-hours per overhaul;
- c. Project mean and maximum down time, reaction time, turnaround time, mean and maximum time to repair, and mean time between maintenance actions;
- d. Number of people required and the associated skill levels at the unit maintenance level;
- e. Maximum effort required to locate and fix a failure; and
- f. Specialized support equipment requirements.

1.3.3 Availability. This paragraph defines, in quantitative terms, the availability goals for specific missions of the project. It should identify the percentage of the projects expected to be operable both at the start of a mission and at unspecified (random) points in time.

1.3.4 Portability and Transportability. This paragraph discusses the portability and transportability features of the project (equipment and software) and describes how they affect employment, deployment, and logistic support requirements. Any subprojects whose operational or functional characteristics make them unsuitable for transportation by normal methods should be identified.

1.3.5 Additional Quality Factors. This paragraph describes any quality features not addressed in the preceding paragraphs (i.e., interoperability, integrity, and efficiency features of the project).

1.4 -- Embedded Security.

If there is embedded security in the project, the software and hardware requirements should be fully identified in paragraph 1.1.3, above, and described here.

1.5 -- Predecessor and/or Reference Project.

This section describes the predecessor and/or reference project. A predecessor and/or reference project is a currently operational or pre-existing project with a mission similar to that of the proposed project. It is often the project being replaced or augmented by the new acquisition. The discussion should identify key project-level characteristics of both the predecessor and/or reference project and the new or proposed project. Any problems associated with the predecessor project should be discussed, along with any significant differences between the predecessor project and the proposed project. The narrative should also describe how the predecessor project is to be replaced with the proposed project (e.g., one-for-one replacements, etc.), as applicable. Information on the planned disposition of the replaced projects should be provided so that disposal costs and benefits can be considered in the cost estimate. The above information should also be provided on analogous subproject and components that can be used to scope or estimate the new project.

2.0 -- Risk.

This section identifies the program manager's assessment of the program and the measures being taken or planned to reduce those risks. Relevant sources of risk include: design concept, technology development, test requirements, schedule, acquisition strategy, funding availability, contract stability, or any other aspect that might cause a significant deviation from the planned program. Any related external technology programs (planned or on-going) should be identified, their potential contribution to the program described, and their funding prospects and potential for success assessed. This section should identify these risks for each acquisition phase (R&D, DEM/VAL, EMD, production and deployment, and O&S).

3.0 -- Project Operational Concept.

3.1 -- Security.

This paragraph describes the project's physical security, information security, and operations security features. Hardware and software aspects of communications and computer security should also be addressed.

3.2 -- Logistics.

This paragraph summarizes key elements of the Integrated Logistics Support Plan (ILSP). The information is divided into the following subparagraphs:

3.2.1 Support Concept. These subparagraphs describe the hardware and software support concepts.

3.2.1.1 Hardware Support Concept. This subparagraph describes the hardware support concept, taking into account:

- a. Service (organic) versus contractor support requirements.
- b. Interim support (fielding) plans.
- c. Scheduled maintenance intervals and major overhaul points.
- d. Maintenance levels and repair responsibilities.
- e. Repair versus replacement criteria.
- f. Standard support equipment to be used.
- g. Specialized repair activities (SRAs).
- h. Hardness assurance, maintenance, and surveillance plans for projects with critical survivability characteristics (e.g., hardness to high altitude electromagnetic pulse).
- i. Other requirements not previously mentioned.

3.2.1.2 Software Support Concept. This subparagraph describes the software support concept, including methods planned for upgrades and technology insertions. The discussion should also address post-development software support requirements.

3.3.3 Training. This paragraph summarizes the training plans for project operators, maintenance personnel, and support personnel.

- a. The training that needs to be accomplished and the organizations that will conduct the training;
- b. The number of projects that must be acquired solely for training purposes;
- c. The need for auxiliary training devices, the skills to be developed by those devices, and computer simulation requirements;
- d. Training times and locations;
- e. Source materials and other training aids;
- f. Other training requirements not previously mentioned.

4.0 -- Quantity Requirements.

This section consists of a matrix identifying the quantities of the project to be developed, tested, produced, and deployed by acquisition phase and year. The quantities identified should be sufficient for maintenance and readiness floats as well as for peacetime attrition requirements. For complete project end-items such as whole engines, the quantities allocated for initial spares and replacement spares should be separately identified.

5.0 -- Project Manpower Requirements.

This section describes the manpower needed to support the project.

6.0 -- Project Activity Rates.

This section defines the activity rates (e.g., number of operating hours per year, flight hours per month or year, operating shifts per day, etc.) for each project or subproject.

7.0 -- Project Milestone Schedule.

This section describes the acquisition schedule for the project. Both hardware and software schedules should be discussed. A Gantt chart showing the major milestones of the program by phase (e.g., design reviews, first flights, significant test events, unique milestone reviews, initial deployment data, and final operational capability) should be provided. A more detailed program master schedule should be included as a reference or appendix. Specific element schedules, if known, should be presented with the descriptions of those elements.

8.0 -- Acquisition Plan and/or Strategy.

This section describes the acquisition plan for the project. It addresses the following:

8.1 -- Contractors.

This paragraph identifies the number of prime contractors expected to compete during each acquisition phase. The specific contractors and subcontractors involved in each phase should be identified, if known. If this information is source selection sensitive, special labeling of the overall CADRE may be required.

8.2 -- Contract Type.

This paragraph describes the type of contracts to be awarded in each phase of the program. The status of any existing contracts should be discussed.

9.0 -- Project Development Plan.

9.1 -- Development Phases.

9.2 -- Development Test and Evaluation.

This paragraph describes all testing to be accomplished during the program. The number, type, location, and expected duration of tests (for both hardware and software) should be identified, along with the organizations that will conduct the test programs. Examples of tests to include are contractor flight tests, static and fatigue testing, logistic testing to evaluate the achievement of supportability goals, etc. Contractor and government-conducted tests should be separately identified.

9.3 -- Operational Test and Evaluation.

This paragraph describes all testing to be conducted by agencies other than NASA to assess the project's utility, operational effectiveness, operational suitability, logistics supportability, etc. The number, type, location, and expected duration of tests (for both hardware and software) should be identified, along with organizations that will conduct the test programs.

10.0 -- Element Facilities Requirements.

10.1 -- Test Facilities.

This paragraph describes the type and number of hardware and software test facilities (both contractor and government owned) required during all phases of program acquisition. Separately identify those funded as part of the acquisition prime contract, those separately funded by the program office (if applicable), and those provided by other activities -- such as a government test organization or facility. Existing facilities that can be modified and/or utilized should be noted..

10.2 -- Operational Support Facilities.

This paragraph describes the type and number of hardware and software facilities required for project deployment, operation and support (including training, personnel, depot maintenance, etc.). Existing facilities that can be modified and/or utilized should be noted. The discussion should describe the size and design characteristics of the respective facilities.

10.3 -- Facilities Commonality.

This paragraph identifies the facilities and equipment that are common to this and other programs. The discussion should specify how these items will be accounted for in the cost estimates.

11.0 -- Track to Prior CADRE.

This section summarizes changes from the previous CADRE. The discussion should address changes in project design and program schedule, as well as in program direction. This section is applicable to projects which have determined that major changes, such as de-scope of requirements, is necessary.

12.0 -- Contractor Cost Data Reporting Plan.

This section contains a copy of the CCDR Plan approved for the program. If the Plan has not yet been approved, or is waiting approval, include a copy of the proposed CCDR Plan.

Enclosure 1

Examples of Key Project Characteristics and Performance Parameters

Aircraft: Airframe unit weight (AUW); breakdown of AUW by material type; empty weight; structure weight; length; wingspan; wing area; wing loading; combat weight; maximum gross weight; payload weight; internal fuel capacity; useful load; maximum speed (knots at SL/maximum altitude); combat ceiling; combat speed; wetted area

Engines: Maximum thrust at sea level; specific fuel consumption; dry weight; turbine inlet temperature (degrees Rankine) at maximum value and maximum continuous value; maximum airflow

Data Automation/ADPE: Type (mainframe, mini, micro); processor (MIPS, MPLOPS, MOPS, SPECMARKS); memory (size in megabytes); architecture (monolithic, distributed)

Electronics: Weight by Type of Project:

<u>Type Project</u>	<u>Performance Measures</u>	<u>Technology</u>	<u>Other</u>
Radar	Output Power	MIMIC	Phased Array
	Range	TWT	Type Scan
	Resolution	VHSIC	Installation
	Classification Capable	Stealth	Reliability
	Frequency	SOS, etc.	Waveform
	Number Phase Shifters	Software	Quantity
			Number of Elements
Communications	Frequency	MIMIC	Tactical/Strategic
	Power	Antenna Type	Secure
	Number Channels	SOS, etc.	Anti Jam
	Interoperability	Stealth	User Community
	LPI	Software	Data/Voice
	Range/LOS/NLOS		
Satellite	Quantity	Size/Weight	Purpose
	Orbit	Launch Vehicle	Coverage
	Number of Users	Processors	Design Life
	Power	Bus	
	Waveform	Software	